

Topic: Given a point on the terminal side of the angle

Question: Find the value of the angle.

What is the value of $\sin \theta$ for an angle θ whose terminal side contains the point $(7, -15)$?

Answer choices:

A $\frac{15}{22}$

B $\frac{7}{\sqrt{274}}\pi$

C $-\frac{15}{\sqrt{274}}$

D $-\frac{7}{22}\pi$



Solution: C

We can do this by substituting $x = 7$ and $y = -15$ into the following formula for $\sin \theta$:

$$\sin \theta = \frac{y}{\sqrt{x^2 + y^2}}$$

Therefore,

$$\sin \theta = \frac{-15}{\sqrt{7^2 + (-15)^2}} = \frac{-15}{\sqrt{49 + 225}} = \frac{-15}{\sqrt{274}} = -\frac{15}{\sqrt{274}}$$



Topic: Given a point on the terminal side of the angle

Question: Find the value of the angle.

What is the value of $\cos \theta$ for an angle θ whose terminal side contains the point $(-16, -8)$?

Answer choices:

A $\frac{2}{3}$

B $-\frac{2}{\sqrt{5}}$

C $-\frac{1}{3}$

D $\frac{4}{\sqrt{5}}$



Solution: B

We can do this by substituting $x = -16$ and $y = -8$ into the following formula for $\cos \theta$:

$$\cos \theta = \frac{x}{\sqrt{x^2 + y^2}}$$

Therefore,

$$\cos \theta = \frac{-16}{\sqrt{(-16)^2 + (-8)^2}} = \frac{-16}{\sqrt{256 + 64}} = \frac{-16}{\sqrt{320}} = -\frac{16}{\sqrt{320}}$$

We can simplify the denominator by noting that

$$\sqrt{320} = \sqrt{64(5)} = \sqrt{64} (\sqrt{5}) = 8\sqrt{5}$$

Therefore,

$$\cos \theta = -\frac{16}{8\sqrt{5}} = -\frac{2}{\sqrt{5}}$$



Topic: Given a point on the terminal side of the angle

Question: Find the value of each angle.

Let α be an angle whose terminal side contains the point (12,5), and let $\theta = \alpha + \pi$, where α is measured in radians. What are the values of $\sin \theta$ and $\cos \theta$?

Answer choices:

A $\sin \theta = -\frac{5}{13}, \cos \theta = -\frac{12}{13}$

B $\sin \theta = -\frac{12}{17}, \cos \theta = -\frac{5}{17}$

C $\sin \theta = \frac{5}{17}, \cos \theta = -\frac{12}{17}$

D $\sin \theta = \frac{12}{13}, \cos \theta = \frac{5}{13}$



Solution: A

First, we'll find $\sin \alpha$ and $\cos \alpha$. We can do this by substituting $x = 12$ and $y = 5$ into the following formulas for $\sin \alpha$ and $\cos \alpha$:

$$\sin \alpha = \frac{y}{\sqrt{x^2 + y^2}}$$

$$\cos \alpha = \frac{x}{\sqrt{x^2 + y^2}}$$

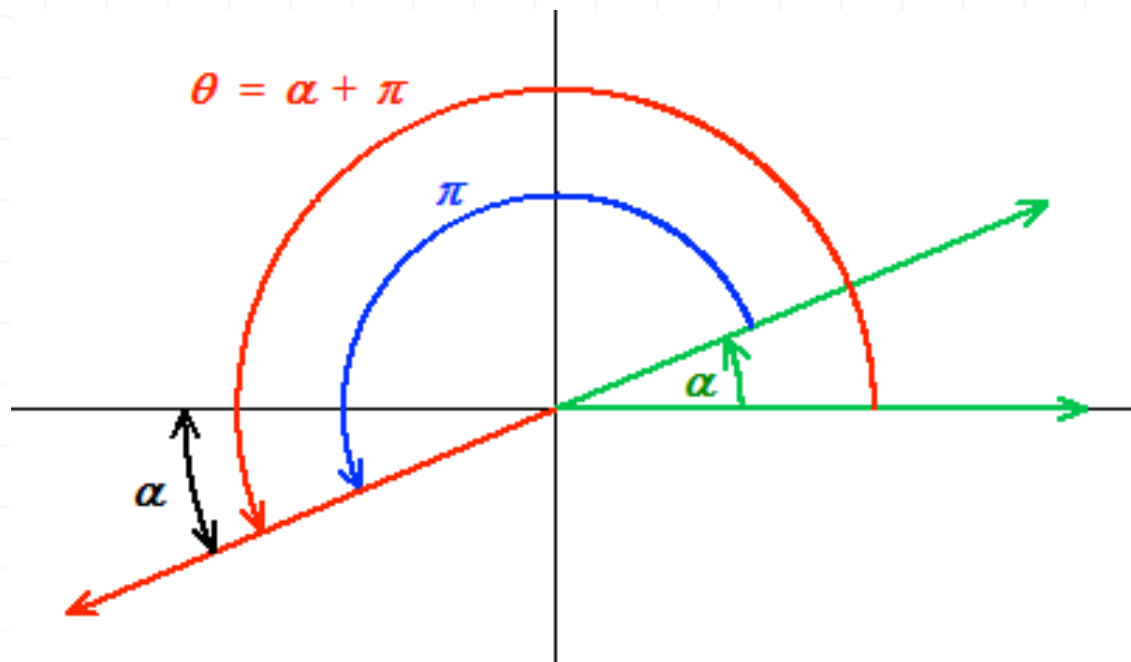
Therefore,

$$\sin \alpha = \frac{5}{\sqrt{12^2 + 5^2}} = \frac{5}{\sqrt{144 + 25}} = \frac{5}{\sqrt{169}} = \frac{5}{13}$$

$$\cos \alpha = \frac{12}{\sqrt{12^2 + 5^2}} = \frac{12}{\sqrt{144 + 25}} = \frac{12}{\sqrt{169}} = \frac{12}{13}$$

Since the point $(12,5)$ is on the terminal side of α , we know that α is in the first quadrant. Thus $\alpha + \pi$ is in the third quadrant. Moreover, the reference angle for θ is equal to α , which is also the reference angle for α itself.





By the reference angle theorem, we obtain the following:

$$\sin \theta = -\sin \alpha = -\frac{5}{13}$$

$$\cos \theta = -\cos \alpha = -\frac{12}{13}$$